cloud and precipitation, while a decrease in solar energy would lead to less cloud and less precipitation. The possibility of increased solar activity leading to an "ice age" is discussed.

Suzuki on fires and the weather.—The author [8] presents in this monograph of 73 octavo pages a vast amount of detailed experimental research, all of which bear witness to the thoroughness of the study. It is quite impossible with the space at command to present a comprehensive review of the various aspects of the research. I shall therefore confine my remarks to those phases of the subject that most appeal to similar studies in this country. Here forest fires only are studied with reference to the associated weather conditions. The author's study, on the contrary, has to do with conflagrations involving buildings, whether singly or in mass, as well as forest fires.

A large part of the statistical material of the study was accumulated through the very simple expedient of burning the ordinary incense stick sold in the shops of Japan. This stick is a thin cylinder with diameter nearly 1.45 mm. and made mainly of powder of fragrant wood and partly of pine resin used as paste. When the upper end is lighted and the stick held upright it burns down steadily without flame.

If conditions remain the same it continues to burn always at a uniform rate.

The incense stick is peculiarly sensitive to moisture and absorbs it readily when exposed to the air, thus five sticks so dried that their total weight was reduced to 1.159 g. when exposed to the air became gradually heavier and after an exposure of 3 hours and 40 minutes reached a maximum weight of 1.259 g.

The effect of the wind in the burning of an incense stick was thoroughly investigated by means of a wind tunnel and cleverly devised apparatus. It was found that the burning velocity 5.3 m/min. at dead calm rises to the maximum 6.3 m/min. when the air current strength becomes 110 m/min. and then gradually decreases until the current velocity rises to 220 m/min., when suddenly the fire in the incense stick goes out.

With respect to the variation of the water content of timber the author concludes:

> The weight of the timber varies in harmony with the change of relative humidity, only differing with regard to time. The time may be retarded by several hours, the actual amount of which depends on the manner of the variation of the humidity.

His conclusions with respect to other phases of the subject are summarized in the following paragraphs.—*A. J. H.*

SUMMARY

Burning every day several incense sticks through a year the author has found that they burn more rapidly in summer than in winter, whilst the daily variation of their burning velocity is subjected to the changing relative humidity of surrounding air. Further, using several other materials the influence of humidity on the burning together with house fires is thoroughly investigated, thus:

1. The most important factor of the problem among the numerous meteorological elements is the relative humidity.
2. The combustion of some substances is influenced, in large degree, by the variation of the water quantity within when they burn in low temperature without flame.
3. The combustion of some substances is influenced by the water quantity of air when they burn with flame and temperature is moderately high.
4. The combustion of other substances is, if temperature is enormously high, controlled by the humidity of air, but in the way contrary to the preceding; that is, they burn strongly with increasing humidity.
5. The influence of wind on fires is not so remarkable as it is now believed.
6. The fire statistics in many cities and prefectures in Japan indicates that the outbreak of fires has the most intimate correlation with the relative humidity among many other meteorological elements.
7. The outbreak of fires undergoes a change yearly and daily. It corresponds in many respects with the seasonal and daily variations of the moisture in timber, paper, and cloth, etc., in the room.

Therefore we can conclude that the relative humidity has the great influence not only on the burning but also on the fires.

Solar coronas of 1°, 2°, and 3° in very clear sky (by Eric R. Miller).—Instead of the usual bright glare around the sun, I was surprised to see three bright rings, exhibiting the colors of the spectrum, when I looked at the sky near the sun at 11:45 a. m., August 31, 1928. These rings were so easily seen that I pointed them out to a number of persons, all of whom saw them easily. They lasted until about 3 p. m., when increasing cirrus obscured them. I measured the red circles, which were most easily seen, and found the radii to be approximately 1°, 2°, and 3°. The rings were again visible on September 2.

The sky was unusually clear. The usual measurement of sky polarization with Pickering polarimeter at 8:18 a. m., August 31, when the zenith distance of the sun was 60°, gave a percentage of 77, which is unusually high.

My surmise is that these rings are a regular solar phenomenon, visible only when glare due to cloud, haze, and dust is absent. I have never seen them before, and recall no reference to them in the literature of meteorological optics. If they have been previously described, I should appreciate having a reference to the publication.

Recorded observations of the Hess ultragamma radiation at Muottas Muraigl (2,456 m.) (by *G. Hoffman* and *F. Lindholm*).—Summary: The increase in the ionising effect of penetrating radiation by the use of compressed carbonic acid gas for filling the ionisation chamber together with an electrometric compensating arrangement enables an accuracy of $1—2^0/_{55}$ to be attained. Continuous records of penetrating radiation are carried out at Koenigsberg (at sea level) and at Muottas Muraigl (2,456 m.) in the Upper Engadine, with a lead screen for shutting out the softer rays from around. The intensity varies with the changes in barometric pressure, but in an irregular manner. No simple variation of intensity according to sidereal time exists. It will be possible to draw further conclusions only after new and extensive observations have been made. By measuring the absorption power of different protecting screens, diffusion effects are found which confirm the character of Hess radiation as ultra-γ-radiation.

METEOROLOGICAL SUMMARY FOR SOUTHERN SOUTH AMERICA, JULY, 1928

By J. BUSTOS NAVARRETE

[Observatorio del Salto, Santiago, Chile]

During July the weather was relatively dry in central Chile and but little rainy in the regions farther south. This was due to two factors: (1) Diminished intensity of atmospheric circulation over the South Pacific and (2) deviation toward the south in the mean path of the depressions, which usually reach the coast between latitudes 40° and 45°.

Depressions crossed the extreme south during the following periods: 1st–4th, 5th–7th, and 14th–15th. The first and second of these storms brought rain as far north as Concepcion; the third was of little importance and

[8] Seitaro Suzuki, "The fires and the weather," Journal of the Department of Agriculture, Kyushu Imperial University, vol. 2, No. 1.

the rainfall area reached only to Valdivia. The depression of the 7th–12th, the most important of the month, appeared in latitude 40° and recurved toward the northwest; it was accompanied by unsettled weather and rain from Chiloe to Coquimbo. The depression off Isla Mocha on the 17th caused fog in the central region and light rain in the southern region.

Periods of fine weather, cold wave, and frost accompanied the principal anticyclones charted during the following periods: 12th–16th, 18th–22d, 23d–25th, and 27th–31st. The first three formed in the region of Chiloe and advanced toward northern Argentina, while the fourth moved from Juan Fernandez toward central Chile and Argentina. The severest cold wave occurred at the end of the month—minimum temperature −11° F. at Caracoles, in the Province of Antofagasta.

Total monthly precipitation: Santiago, 1.81 inches; Valdivia, 17.84 inches.—*Translated by W. W. R.*

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